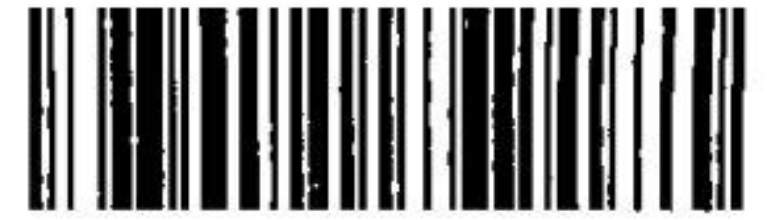


D.G.E - Hr Sec (+2) EXAMINATION - MARCH / APRIL 2023

(A)



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SUBJECT : 507 CHEMISTRY

(C)

APPLIED FOR : SCANCOPY



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(B)

D.G.E - Hr Sec (+2) EXAMINATION - MARCH / APRIL 2023

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SUBJECT : 507 CHEMISTRY

Mark already Awarded	Mark after Retotalling / Revaluation	+/-	Mark in Difference

Designation	Signature
Examiner 1	
Examiner 2	
Examiner 3	

J.D(Ret./Rev)

J.D(H.S)

Director

Stitching line

SUB CODE : 507

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மதிப்பெண்கள் பக்கம் / MARKING PAGE

Total Marks

5 3 1

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DEPARTMENT OF GOVERNMENT EXAMINATIONS

5 4

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Camp No. 05

Qn Booklet Series
(Tick the appropriate Box)

Script No.

0 8

விடைத்தாள் திருத்துவோர் நிறைவு செய்ய வேண்டியவை
FOR THE USE OF EXAMINERS ONLY

A	
B	<input checked="" type="checkbox"/>

வினா வாரியாக மொத்தம் Questionwise Total								பக்க வாரியாக மொத்தம் Pagewise Total					
வினா எண் Q.No.	மதிப்பெண்கள் Marks	வினா எண் Q.No.	மதிப்பெண்கள் Marks	வினா எண் Q.No.	மதிப்பெண்கள் Marks	வினா எண் Q.No.	மதிப்பெண்கள் Marks	பக்க எண் Page No.	மதிப்பெண்கள் Marks	பக்க எண் Page No.	மதிப்பெண்கள் Marks	பக்க எண் Page No.	மதிப்பெண்கள் Marks
1	0	16	2	31		46		1	7	16	1	31	
2	1	17	2	32	2	47		2	3	17	3	32	
3	1	18	1	33	2	48		3	3	18	2	33	
4	1	19	2	34	4	49		4	1	19		34	
5	0	20	0	35	4	50		5	2	20		35	
6	1	21		36	5	51		6	3	21		36	
7	1	22		37	5	52		7	3	22		37	
8	1	23		38	2	53		8	5	23		38	
9	0	24	1	39		54		9	5	24		39	
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11	1	26	3	41		56		11	2	26		41	
12	0	27	3	42		57		12	3	27		42	
13	0	28		43		58		13	2	28		43	
14	0	29	1	44		59		14	1	29		44	
15	1	30	3	45		60		15	3	30		45	
மொத்தம் TOTAL I	8	மொத்தம் TOTAL II	20	மொத்தம் TOTAL III	20	மொத்தம் TOTAL IV		மொத்தம் TOTAL V	47	மொத்தம் TOTAL VI	7	மொத்தம் TOTAL VII	
வினா வாரியாக ஒட்டு மொத்தம் Question-wise Grand Total (I + II + III + IV)								பக்க வாரியாக ஒட்டு மொத்தம் Page-wise Grand Total (V + VI + VII)					
54								54					

AE: 05.506
19/4/23
CANSO: 0506
19/4/23

CE: 05062



தேர்வு எழுதுபவர் செய்யக்கூடியவை மற்றும் செய்யக்கூடாதவை
Do's & Don't's for Candidates

1. முகப்புச்சீட்டில் உரிய இடத்தில் கையொப்பமிட வேண்டும்.
Put your signature in the Top sheet in the appropriate place.
2. விடைத்தாளில் ஒரு பக்கத்திற்கு 20 முதல் 25 வரிகள் வரை எழுதவேண்டும்.
Write 20 to 25 lines in a page.
3. விடைத்தாளின் இருபுறத்திலும் எழுத வேண்டும்.
Write answers in both sides of paper.
4. செய்முறைகள் யாவும் விடைத்தாளின் கீழ் பகுதியில் இடம் பெறவேண்டும்.
All rough works must be done on the lower part of the page.
5. சரியான வினா எண் தவறாமல் எழுத வேண்டும். வினா எண் எழுதாத மற்றும் தவறான வினா எண்கள் குறிப்பிடப்பட்டு எழுதப்பட்ட விடைகள் மதிப்பீடு செய்யப்படமாட்டாது.
Write the question numbers without fail. Answers without question numbers and wrong question numbers will not be valued.
6. இரு விடைகளுக்கிடையே இடைவெளி விட்டு எழுத வேண்டும்.
Leave space between two answers.
7. வினாத்தாளின் வரிசை (A or B) மதிப்பெண்கள் பக்கத்தில் குறிக்கப்படல் வேண்டும்
Question paper booklet series (A or B) should be mentioned in the Marking Page
8. விடைத்தாளில் நீலம் அல்லது கருப்புமை கொண்ட பேனாவால் விடைகளை தெளிவாக எழுத வேண்டும்.
Answers must be legibly written either in Blue or Black ink pen.
9. விடைத்தாளில் எழுதாத பக்கங்களில் குறுக்குக்கோடு இடவேண்டும்.
Cross the unwritten pages.
1. வினாத்தாளில் எந்தவித குறியீடும் இடக் கூடாது.
No marking in the question paper.
2. விடைத்தாளை சேதப்படுத்தக் கூடாது.
Don't damage the answer paper.
3. விடைத்தாளில் எந்த ஒரு பக்கத்திலும் தேர்வு எண்/பெயர் எழுதக்கூடாது.
Don't write name, Register Number in any page of the answer book.
4. வண்ணக்கலர் கொண்ட பேனா/ பென்சில் எதையும் பயன்படுத்தக் கூடாது.
Don't write with sketch / colour pencils.
5. விடைத்தாள் கோட்டின் இடது ஓரத்தில் எழுதக்கூடாது.
Don't write on the left margin.
6. விடைத்தாள் புத்தகத்தின் எந்த தாளையும் கிழிக்கவோ/நீக்கவோ கூடாது.
Don't tear / remove any page from the answer book.
7. "விடைத்தாளில் எழுதிய ஒன்றுக்கு மேற்பட்ட / அனைத்து சரியான விடைகளையும் அடித்தல் கூடாது."
Don't strike more than one / all correct answers written in the answer book.

1. Answer the following: [1m]

1. a) Agcl. ✓

2. a) We acid

3. c) Antacid.
d) tranquilizer.

4. d) + b.

5. a) Methanol.

6. a) sp^2 ✓

7. b) Al ✓

8. a) Schiff's base.

9. d) H.T.O.

10. a) $[CoCl_6]^{4-}$

11. c) Activation energy.



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12.

a) CH_3COOH

13.

a) Assertion is true and Reason is false

14.

a) Xe f

15.

d) Gel-butter.

Part-II

Answer the following [2 marks] :

16. ✓

* The Ores that are concentrated by froth floatation method are ~~Galena (PbS) and Zinc blende~~

* "sulphide Ores."

such as

* Galena ✓

* Zinc blende ✓

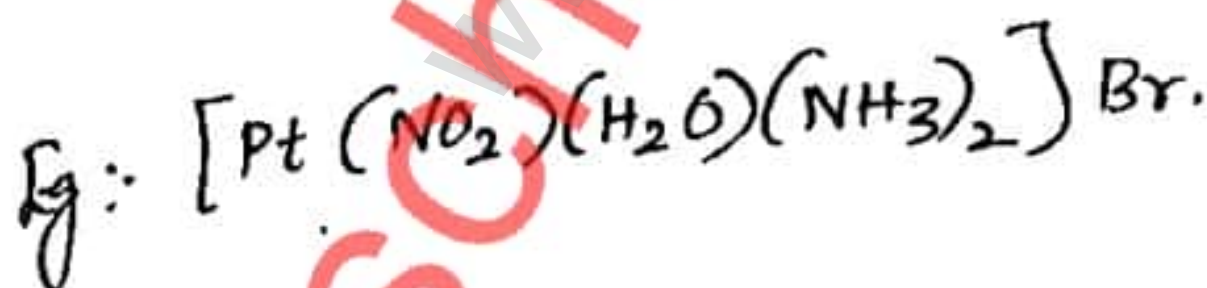
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17. Uses of Silicons:-

- * Silicons are used for low temperature lubrications, in vacuum pumps and high temperature oil baths etc.
- * Silicons are used for water proofing clothes.
- * Silicons are used for making electrical appliances and electric motor.

18. Central atom:-

* The term Central atom or ion is defined as the ion present near the ligand in the coordination (Complex compound). Covalent bond.



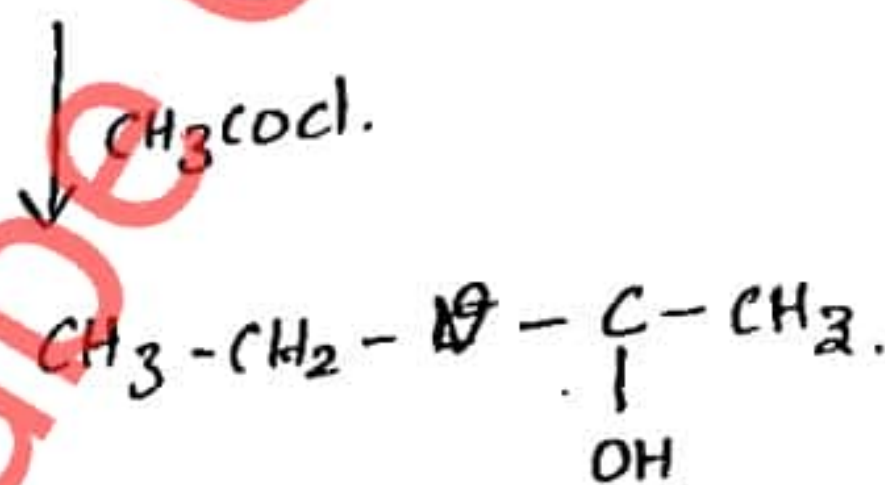
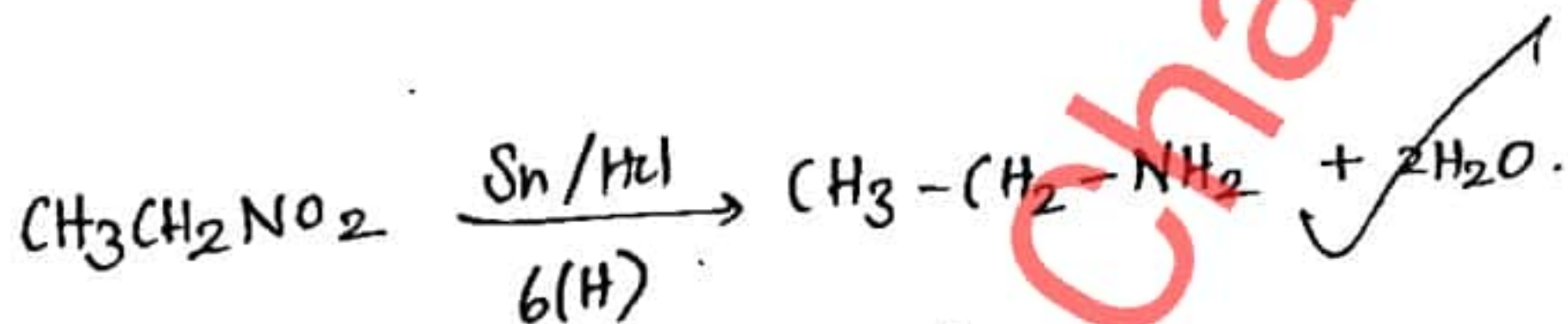
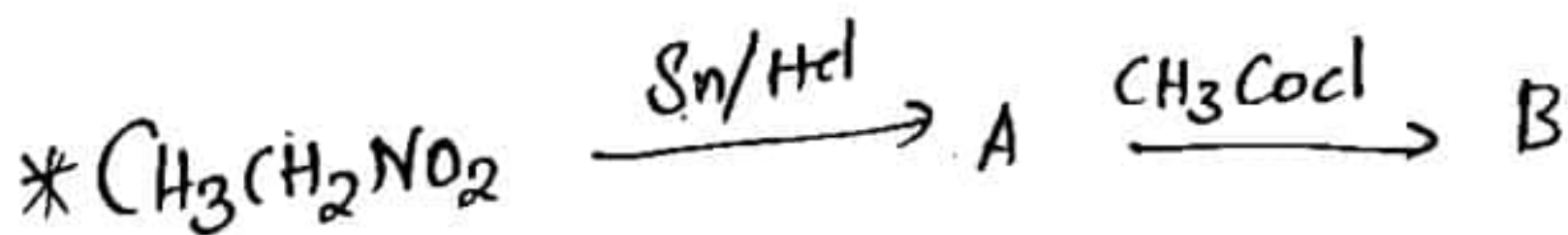
⇒ The central metal atom is Pt.



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Comp:

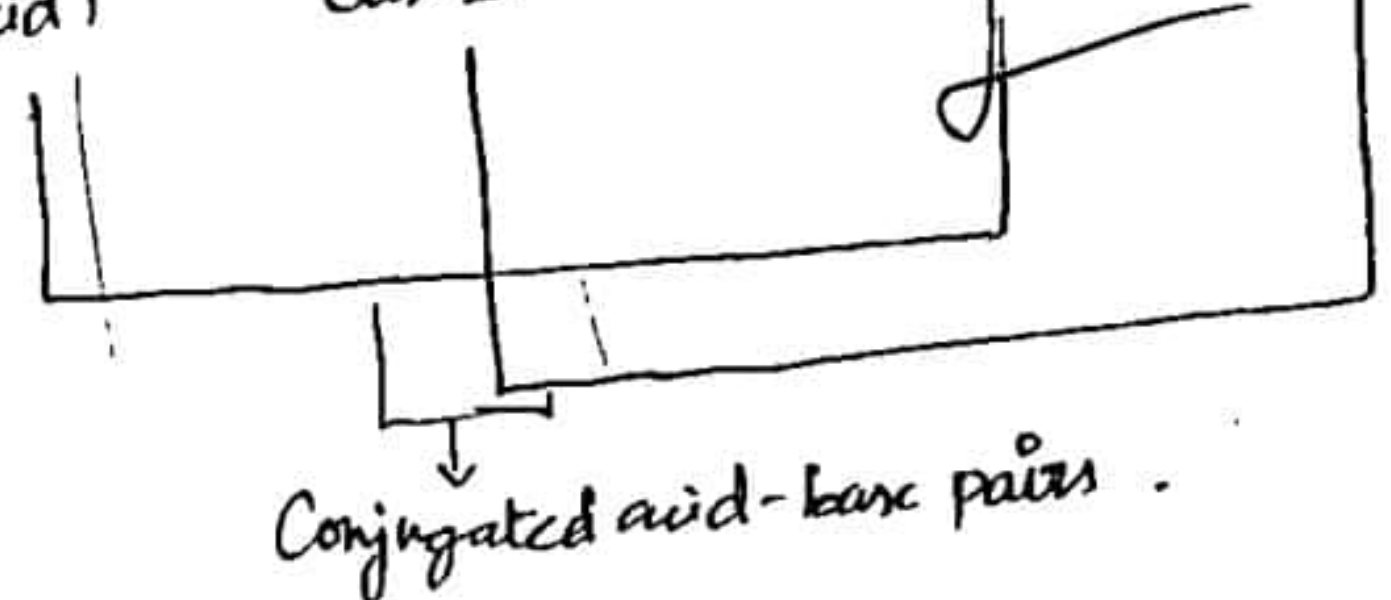
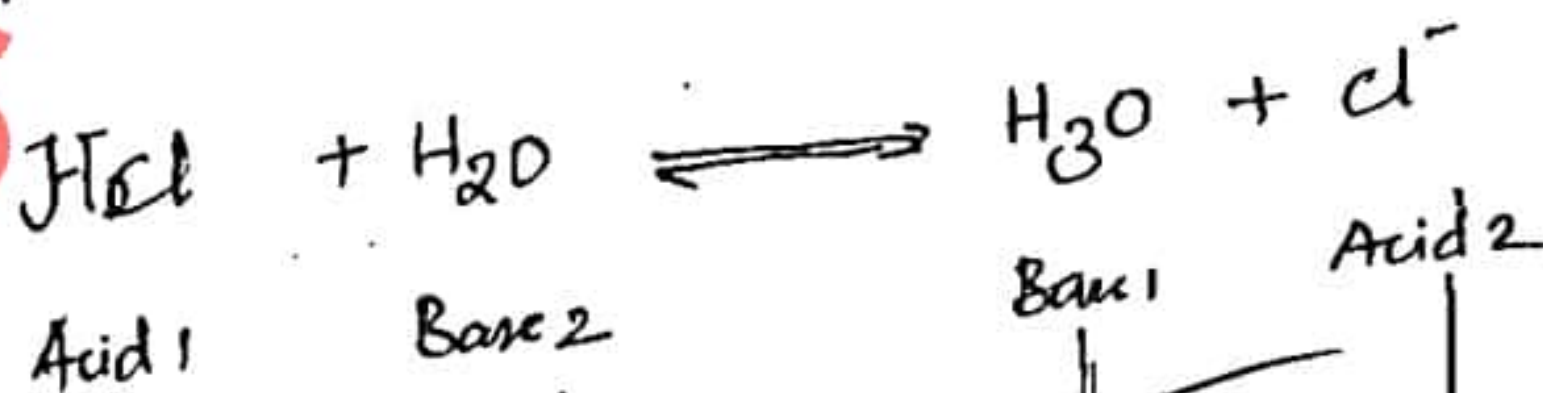


Compound A $\Rightarrow \text{CH}_3-\text{CH}_2-\text{NH}_2$
 Compound B \Rightarrow
 $\text{CH}_3-\text{CH}_2-\text{N}-\text{C}-\text{CH}_3$
 $\quad \quad \quad |$
 $\quad \quad \quad \text{OH}$

20. Conjugated acid-base pairs:

* The conjugated acid base pairs of (Acid 1) to the conjugated acid base pair of (Base 1) is called as conjugated acid base pairs.

Eg:





19) In FCC unit.

the number of atoms.

solnⁿ

$$= \frac{N_c}{8} + \frac{N_a}{2}$$

$$= \frac{8}{8} + \frac{6}{2}$$

$$\text{FCC} = 1 + 3 = 4$$

The number of atoms present in FCC = 4.

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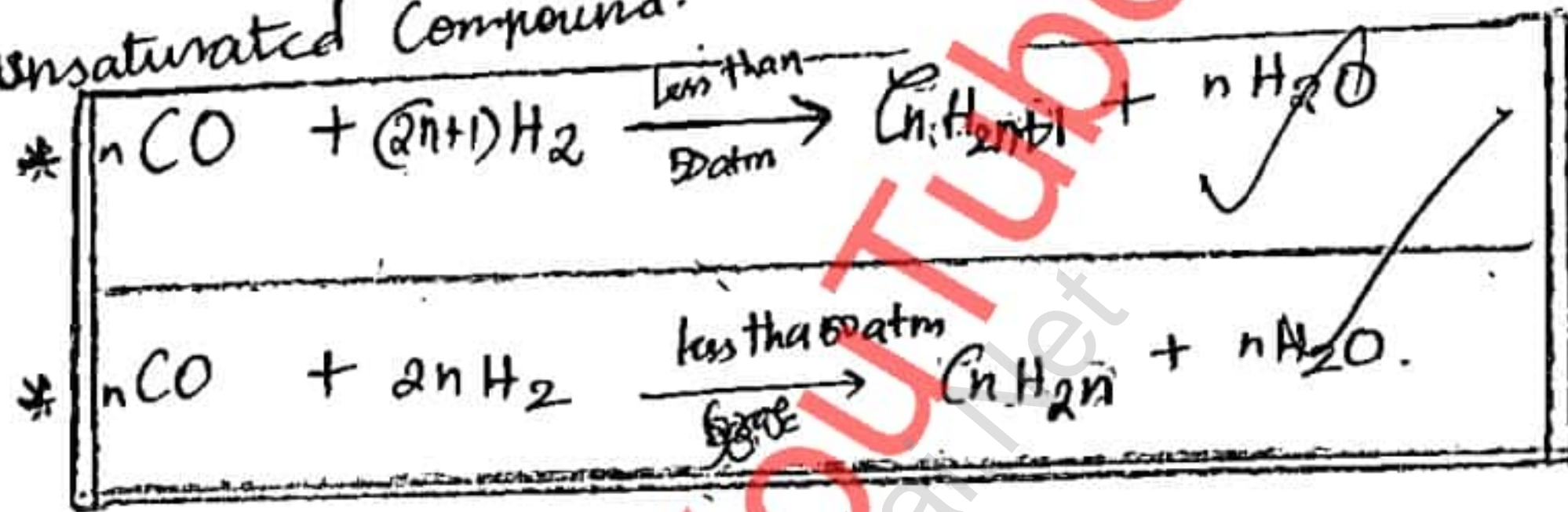
Part-III



Answer the following:

25) Fischer Trotsch Synthesis:-

* The mixture of carbon monoxide with ^{hydrogen} water at less than 50 atm pressure and 550°C to give saturated and unsaturated compound.



* The element in the Coordination complex of transition metal. Hence, the transition metal is zero.

Eg: * Nickel tetracarbonyl $[Ni(CO)_4]$

* Iron Pentacarbonyl $[Fe(CO)_5]$

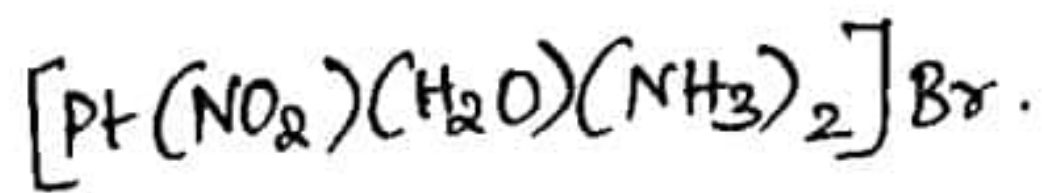
* Copper hexacarbonyl $[Cu(CO)_6]$

26. Diff between Actinoids and Lanthanoids.

Lanthanoids	Actinoids.
* Differentiating elements in the 4f orbital	* Differentiating element in the 5f orbital.
* Binding energy of 4f orbital is lower	* Binding energy of 5f orbital is higher.
* They have less tendency to form complex	* They have high tendency to form complex.
* Usually, Lanthanoids are colourless	* Actinoids are coloured U^{2+} (red), UO_2^{2+} (green) UPO_2^{+} (yellow).
* They do not form oxo-cations.	* They do form oxo-cations.
* Usually, Lanthanoids possess +3 oxidation states, but, they also have +4 and +5 oxidation states also.	* Usually, Actinoids have +3 oxidation states, but, they also have +4, +5, +6 and +7 oxidation states.

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27)



a) Central atom/ion:- Pt ✓

b) Co-ordination number :- 4 ✓

c) Oxidation number :- $x + (-1) + 0 + 2(-1) = 0$

$$x + (-2) - 2 = 0$$

$$x - 2 = 0$$

$$x = 2$$

$$= +2 //$$

32)

Food preservative :-

* "Food preservative" is the process of inhibiting, retarding or ~~reversing~~ the process of decomposition the food by the process of using microorganisms.

Eg: ⇒ * Acetic acid like sorbic acid used for preservative in pickles.

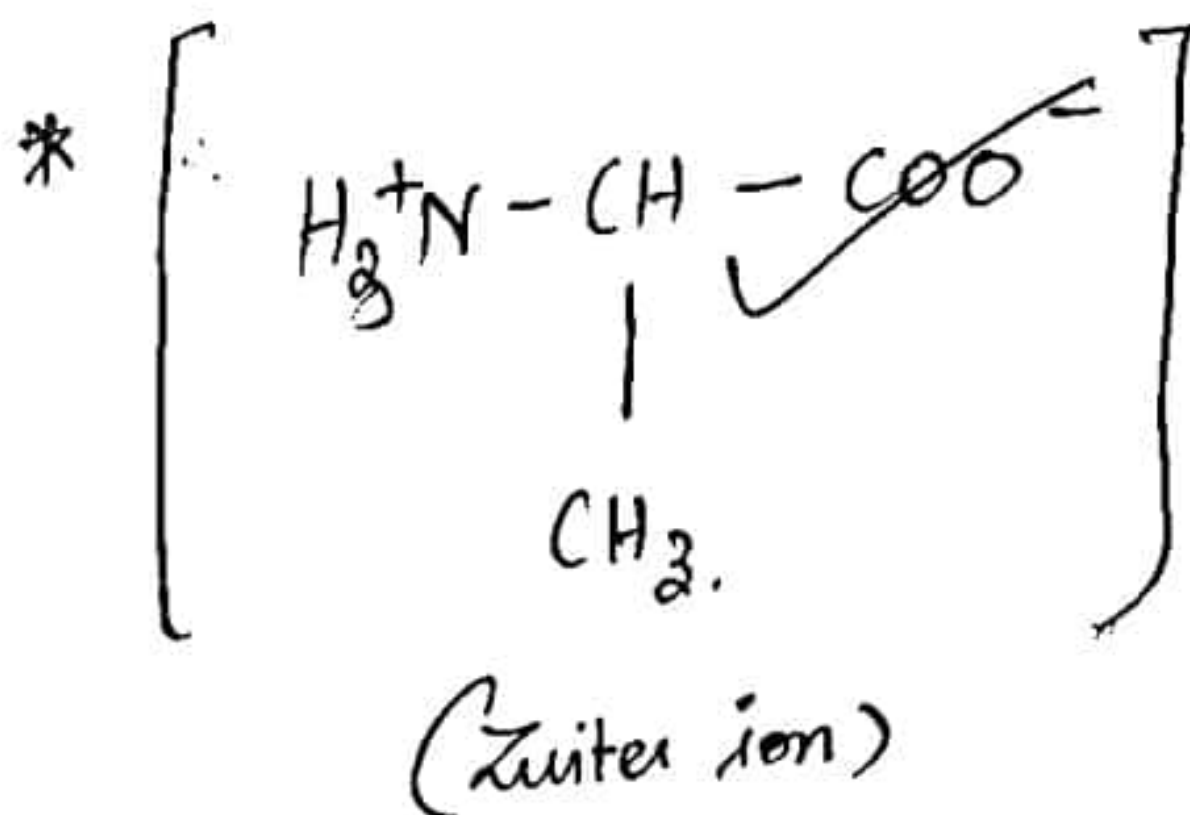
* Acid like vinegar and such as yeast used for the preservative of curd



30)

Structure of Zwitter ion :-

3

33) Compulsory :-2 Given :-

First order rxn.

$$K = \frac{2.303}{t} \log \frac{[A_0]}{[A]}$$

$$K \Rightarrow 2(t_{90\%}) = t_{99\%}$$

$$t_{90\%} = [A_0] = 100$$

$$[A] = 10$$

$$t_{90\%} = \frac{2.303}{k} \log \frac{100}{10}$$

$$t_{90\%} = \frac{2.303}{k} \log 1 \quad \times k = 1$$

$$t_{90\%} = 2.303$$

$$t_{99\%} = 2(2.303)$$

$$= 4.606$$

$$\frac{2.303}{2}$$

$$4.606$$

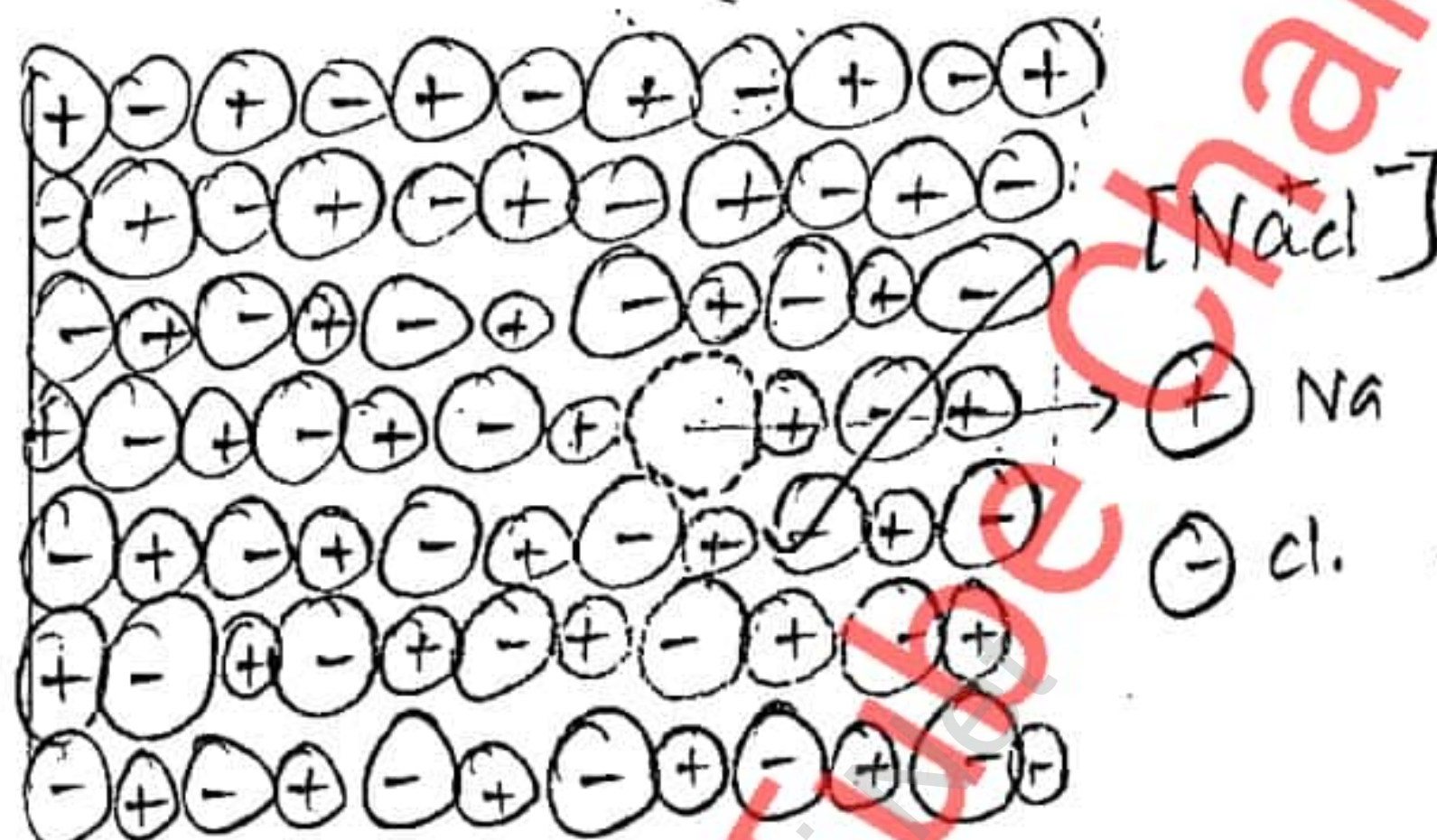
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Part-IV. Answer the following [5m].

36)

Schottky defect :

(5)



SCHOTTKY DEFECT.

* Schottky defect arises due to the missing of equal number of anion and cations in the crystal lattice.

* They have equal ^{size} number of anions and cations in the crystal lattice.

* Eg: NaCl.

* The schottky defect increases, then the density also varies.

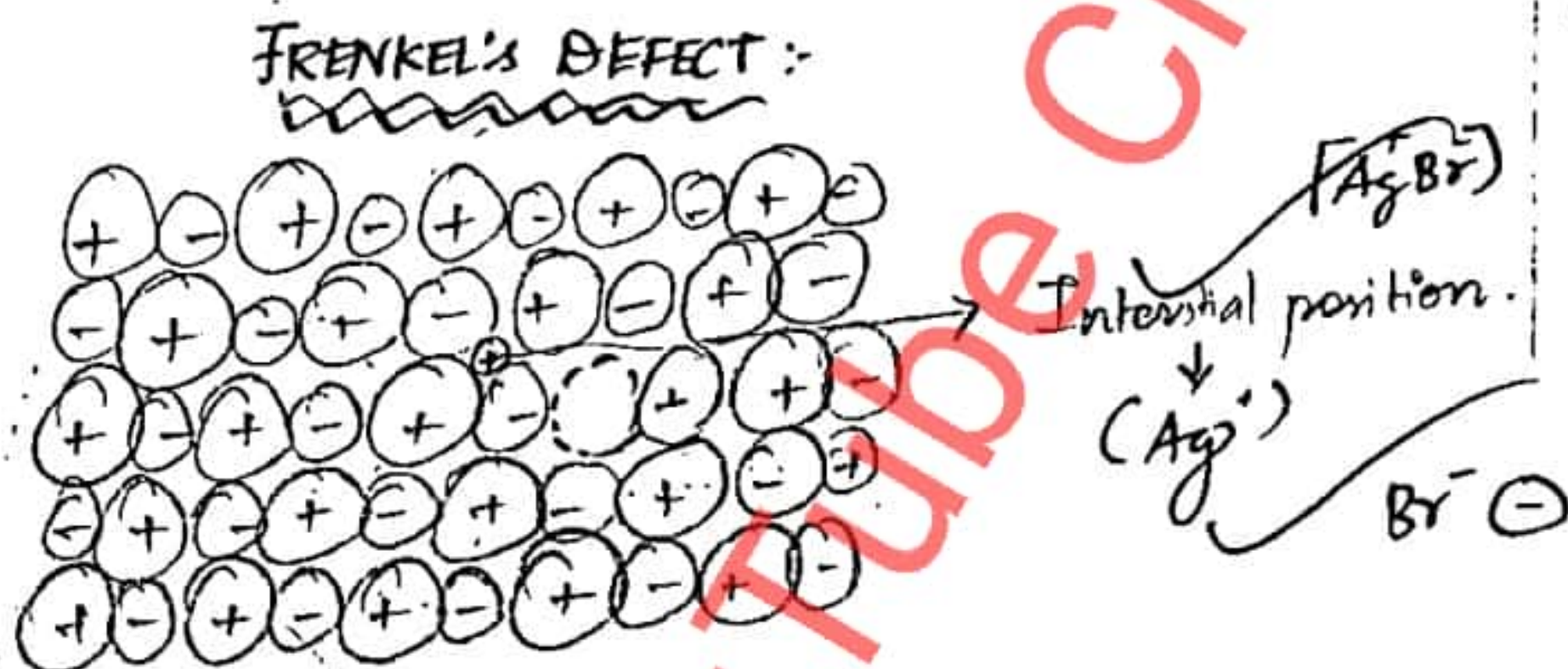
* Eg: The actual experimental density for Vanadium Monoxide VO is 6.5 gm^3 . But the schottky defects

1/2

2/2

have 5.6 g cm^{-3} . This shows the presence of Schottky defect. There is an approximate density value in VO.

Frenkel's defect:



* Frenkel defect arises due to number of anion and cation in which the ion present in the interstitial position.

* They have unequal size of anion and cations in the crystal lattice.

Eg:- AgBr

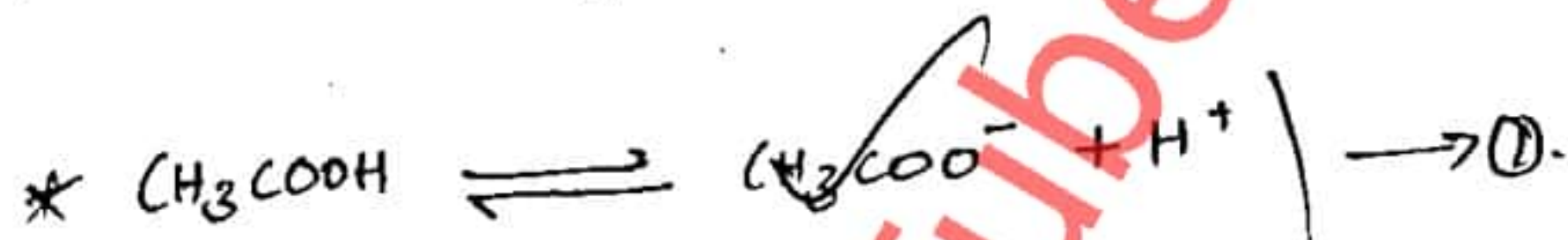
* This missing ion present in the interstitial position does not affect by density. Frenkel defect have no change in the density.

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37) a)

Ostwald's Dilution Law :-

* The law states that the degree of dissociation (α) is equal to the dissociation constant k_a and the concentration of the constituent ions.



$$* K_a = \frac{[\text{CH}_3\text{COO}^-][\text{H}^+]}{[\text{CH}_3\text{COOH}]} \quad \rightarrow (2)$$

	CH_3COOH	CH_3COO^-	H^+
Initial Concentration	1	—	—
Dissociation Constant	α	—	—
Degree of dissociation	$1-\alpha$	α	α
Concentration	$c(1-\alpha)$	$c\alpha$	$c\alpha$

* From the above conclusion, we

get -

$$* k_a = \frac{[\alpha c][\alpha c]}{[1-\alpha]c} \quad \rightarrow (3)$$

$$K_a = \frac{\alpha^2 c}{(1-\alpha)c}$$

$$K_a = \frac{\alpha^2 c}{1-\alpha}$$



$$1-\alpha \approx 1$$

$$K_a = \alpha^2 c$$

$$\alpha^2 = \frac{K_a}{c}$$

$$\alpha = \sqrt{\frac{K_a}{c}}$$



$$[OH] = K_b \cdot c //$$

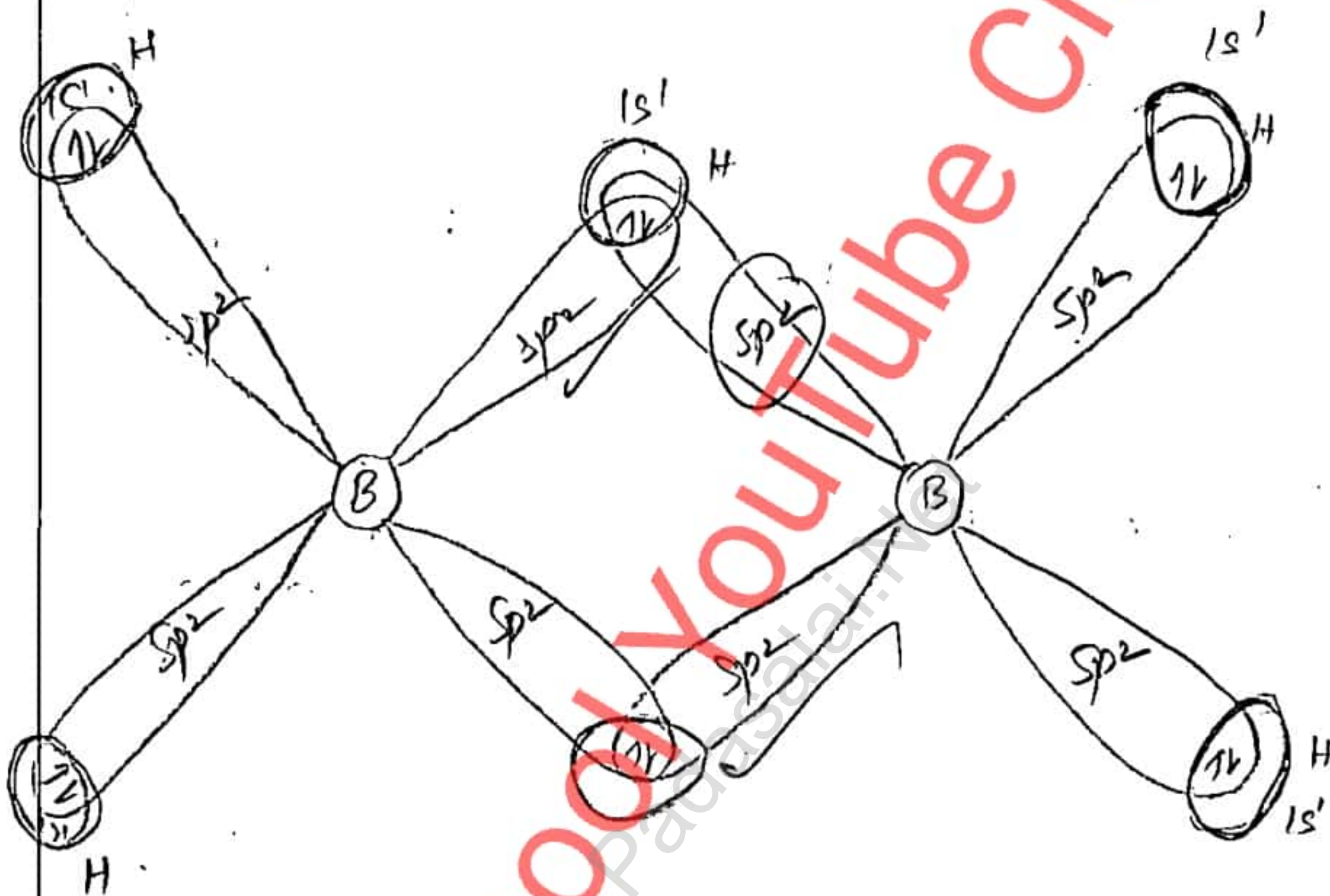
This is known as Ostwald dilution law.

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2

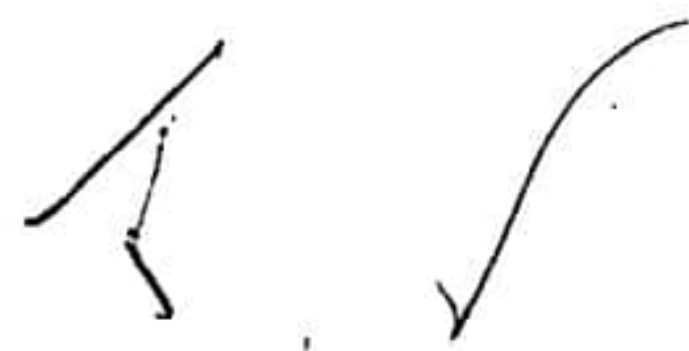
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35) a) 1) Structure of Diborane :



* The structure of Diborane is the B-H bonding of element. in which they have 12 valence and in that there are only 4 pi is used remaining 8 are removed. Then, it form $(2q - 2e)$ bonding in the structure of B-H bond

* Then, there is B-H-B bond, in which



that possess hydrogen 1s¹ in bonding to form (3c-2e) bonding in the structure of B-H-B.

* Hence, it is sp^2 hybridisation.

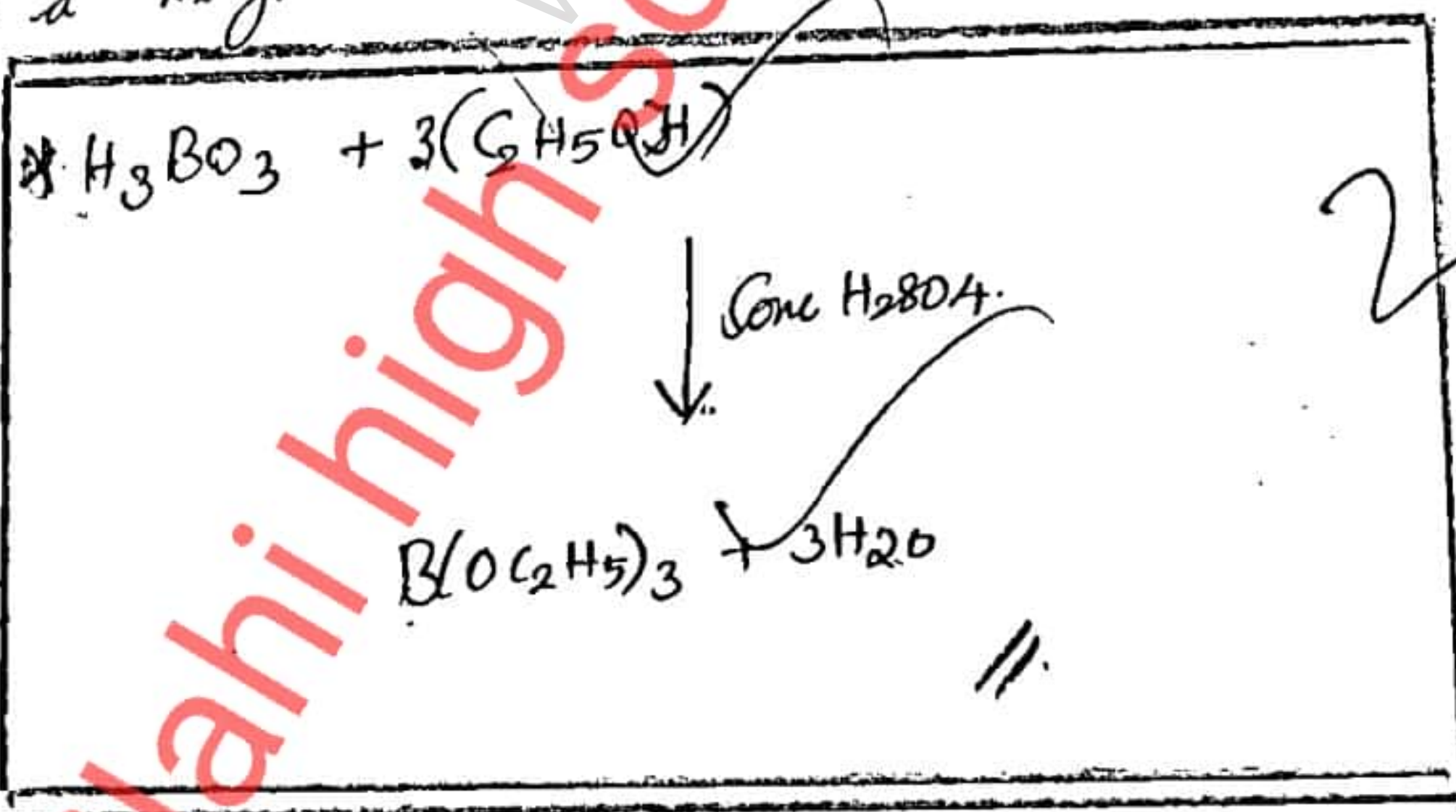
* Then, the another bonding B-H-B also have 1s¹ H and form (2c-2e) bonding in the structure of diborane

(ii) Ethyl borate Test :-

* This test used to find the presence of Boric acid.

* It is mixed with green edged flame.

⇒ When the borax or boric acid with ethyl borate to form a Ethyl borate.



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34) a) Zone - Refining process :-

* Zone - Refining process is based on the fractional crystallization.

* It is the process of refining the impure metal into pure metal by the process of zone refining method.

* In this method, there are two electrodes one of which have metal like rod, and another is heating motor.

* When the rod is adjusted and allowed to heat at one end and it just moved to the another end.

* Then, the another end of rod moved to the heating point, then the impure metals moved to the other end of the rod.

* Here, the rod moves back to another end of heating, the impure metal keeps moving from

one end of the rod to another end of the rod.

* Hence, the process in which it takes again and again by moving the rod, the impure metal are removed and the pure metal is obtained.

* This process is known as zone-refining

process

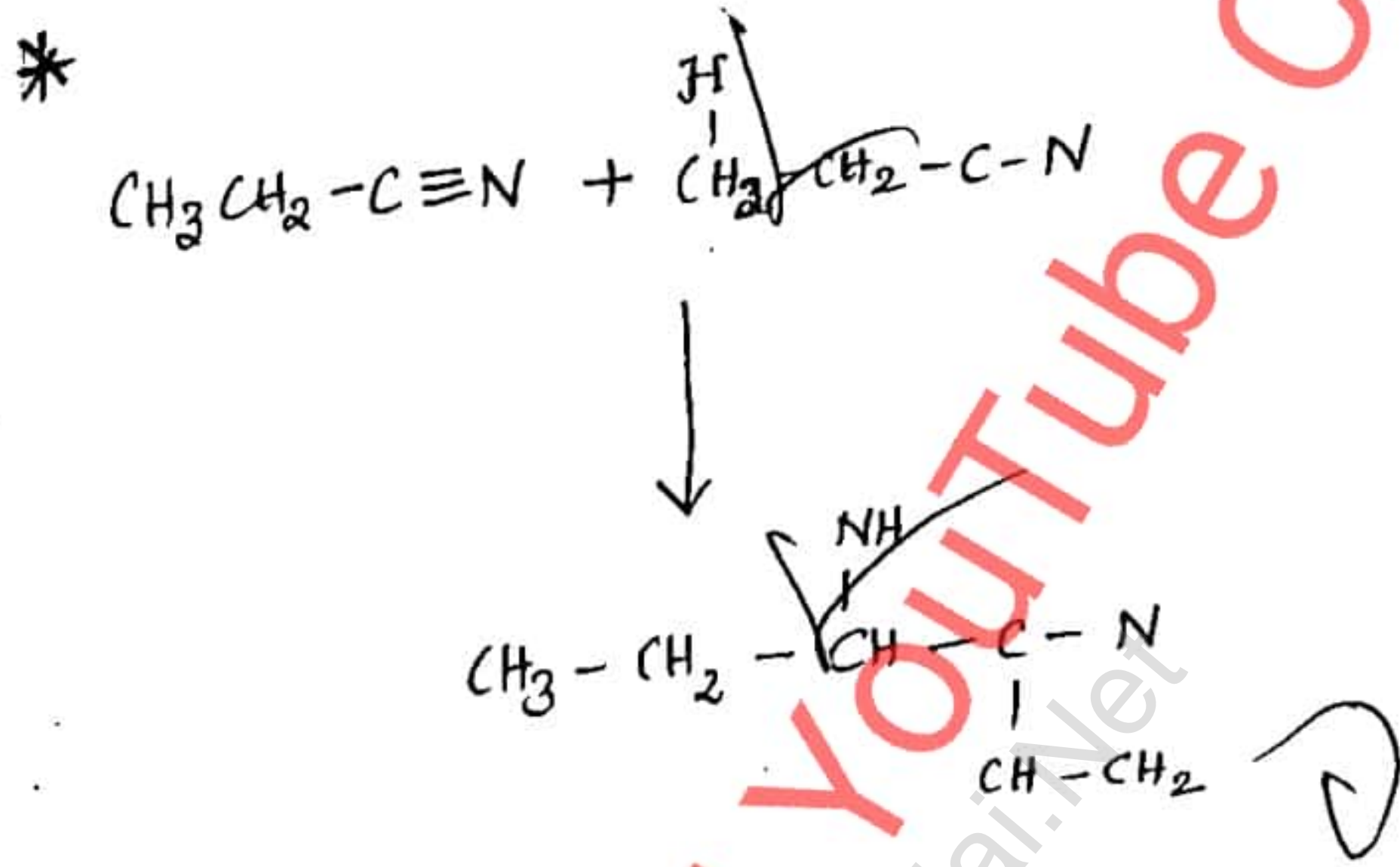
* Such elements like Bismuthum, Iron, Cobalt are the examples and used for the process of zone-refining to obtain pure metals.

3 1/2

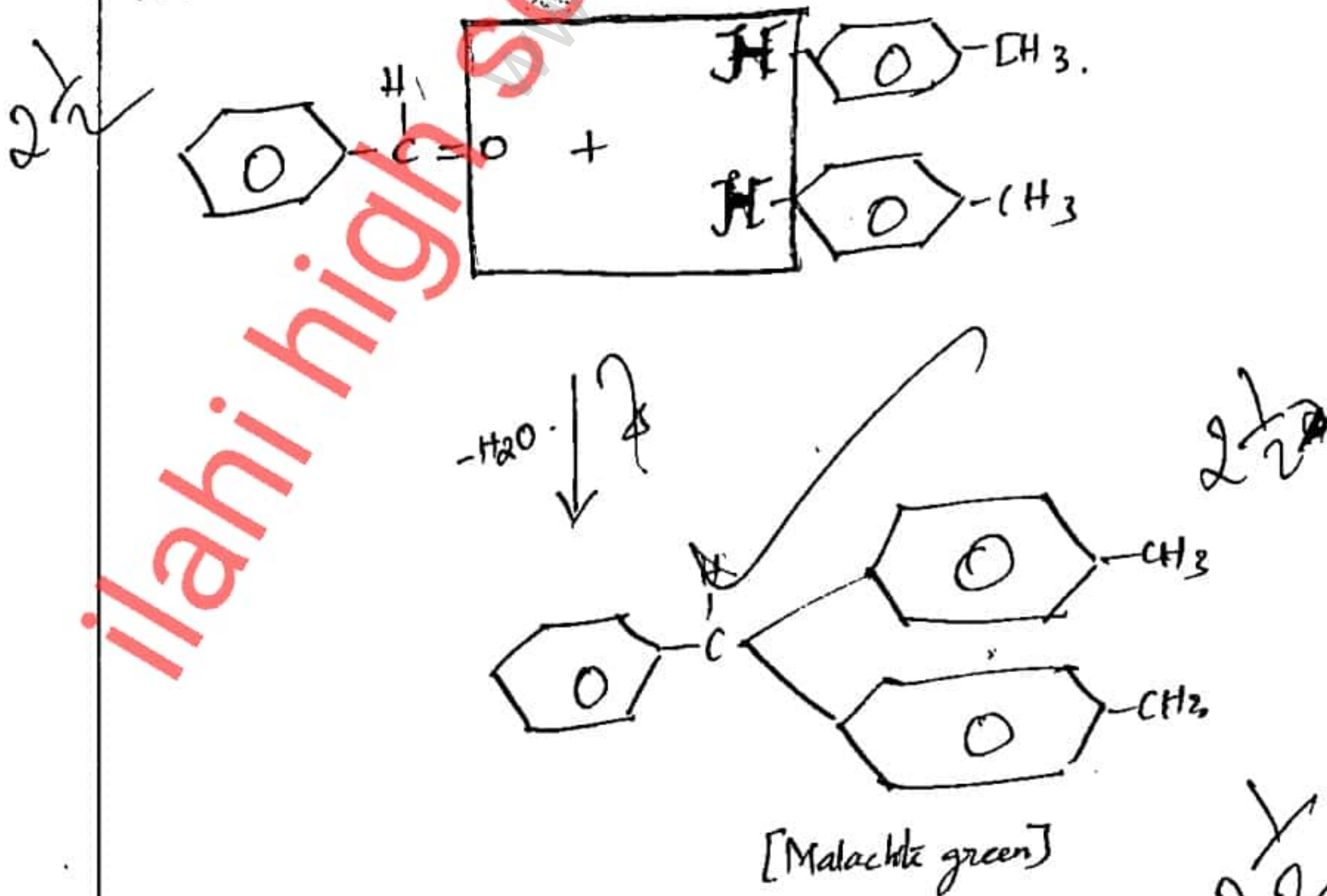
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38) (i) Thorpe-Nitrile Condensation:



(ii) Malachite green



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89) First law of electrolysis.

✓✓

* The mass of substance is liberated at an electrode during electrolysis is directly proportional quantity of charge passed through the cell.

$$m \propto Q$$

$$m \propto It$$

$$m = ZIt$$

$$m = Z$$

$$\text{I} = 1\text{A}, t = 1\text{st}$$

extra



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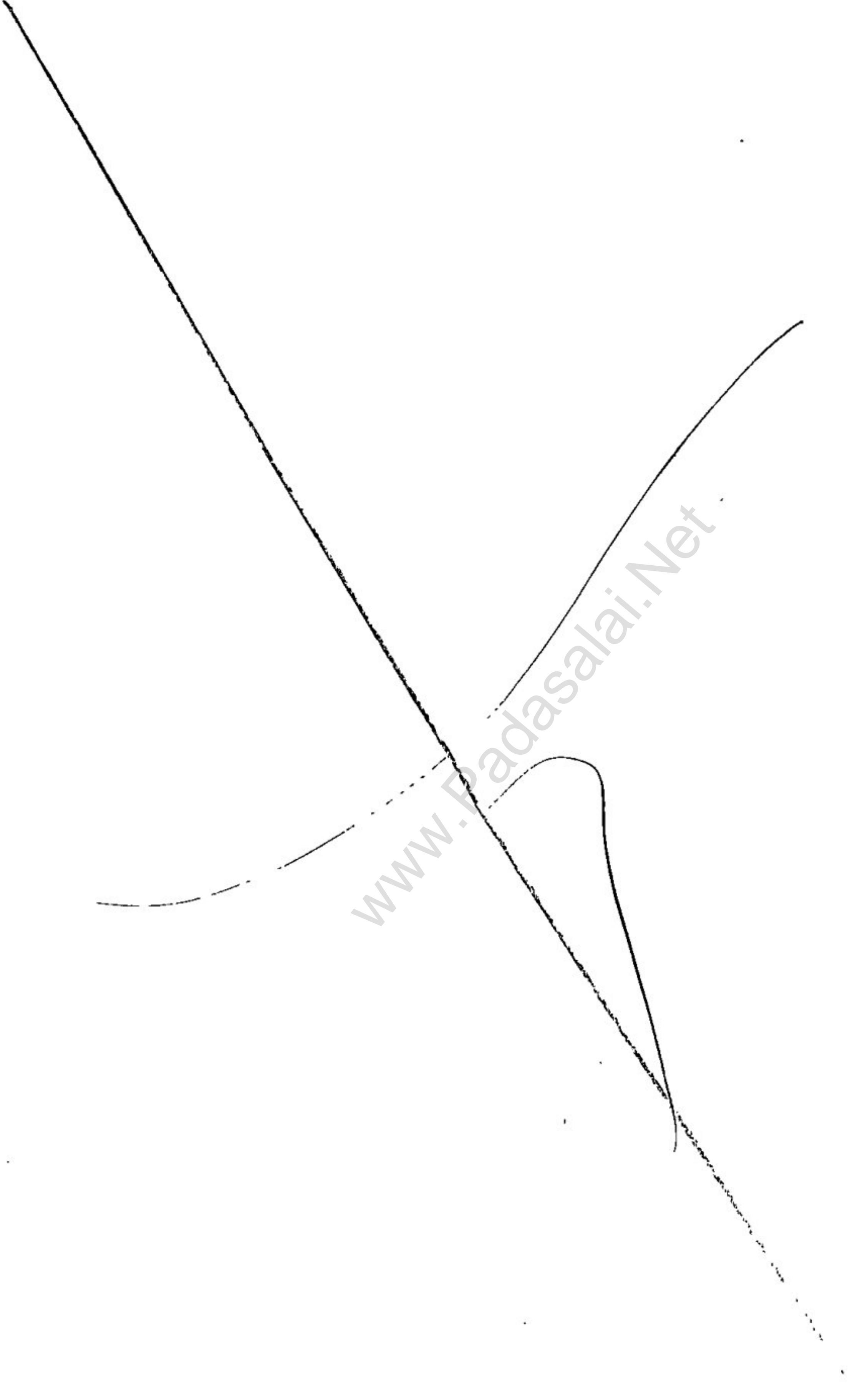
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$$t_{99\%} = 2(t_{90\%})$$

$$k = \frac{2.303}{t_{99\%}} \log \frac{[A_0]}{[A]}$$

$$[A_0] = 100$$

$$[A] = 10$$

$$k = \frac{2.303}{t_{90\%}} \log \frac{100}{10}$$

$$k = 1$$

$$t_{99\%} = \frac{2.303}{k} \log 10$$

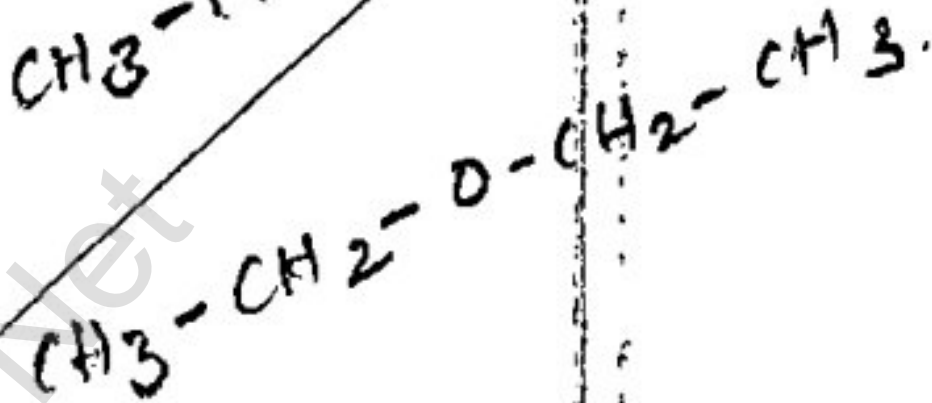
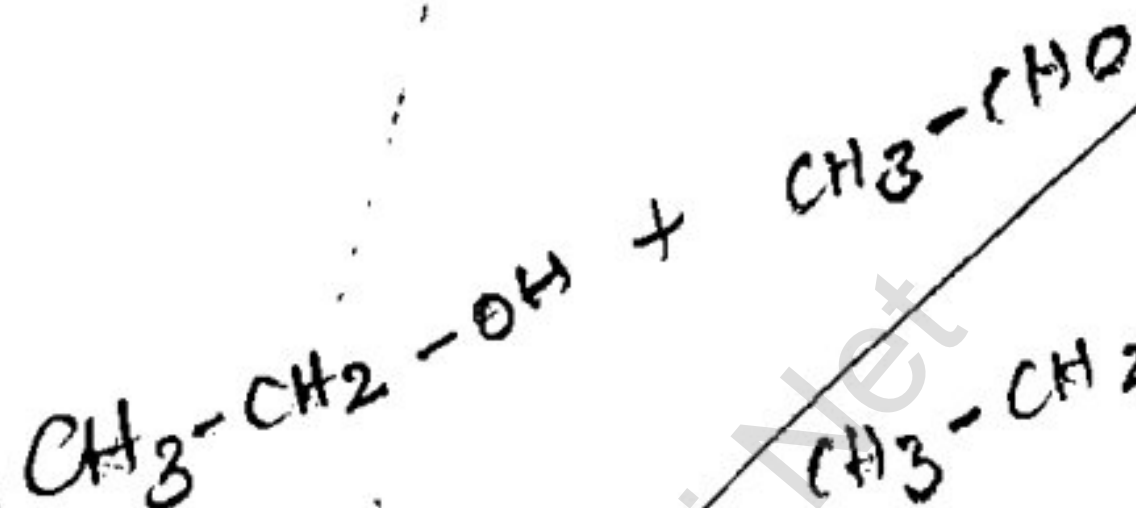
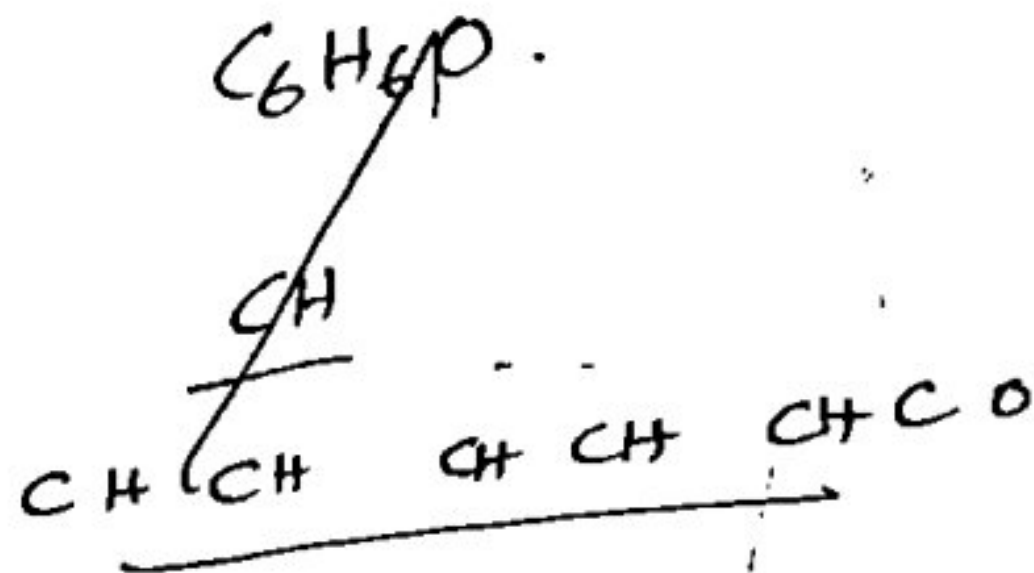
$$t_{99\%} = 2.303$$

$$t_{90} = 2(2.303)$$

$$= 4.606$$

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Rough work:



$$t_{99\%} = 2(t_{90\%})$$

$$\begin{array}{r}
 2.303 \\
 \hline
 2 \\
 \hline
 4.006 \times 3600
 \end{array}$$

$$\begin{array}{r}
 13.21 \\
 4.606 \\
 \hline
 36 \\
 \hline
 226.56 \\
 138.18 \\
 \hline
 1658.1600 \\
 \hline
 165
 \end{array}$$

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எண்.
Qn.No.

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